

WHAT IS CLAIMED IS:

1. A method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer, comprising  
5 the steps of:

homogeneously mixing a preceramic polymer powder, expandable hollow microspheres and a ceramic powder, and molding the mixture to form a molded body;

heating the molded body to expand it;

10 curing the expanded molded body; and

pyrolyzing the cured molded body.

2. The method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer  
15 according to claim 1, wherein the ceramic powder is at least one material selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{MgO}$ ,  $\text{SiC}$ ,  $\text{TiC}$ ,  $\text{Si}_3\text{N}_4$ ,  $\text{AlN}$ ,  $\text{TiN}$ ,  $\text{MoSi}_2$ ,  $\text{WC}$  and mixtures thereof.

3. The method for fabricating a highly porous ceramic  
20 from expandable microspheres and a preceramic polymer as according to claim 1, wherein the ceramic powder is added in an amount of 50% by weight or less, based on the total weight of the starting materials.

25 4. A method for fabricating a highly porous ceramic from

expandable microspheres and a preceramic polymer, comprising the steps of:

homogeneously mixing a preceramic polymer powder and expandable hollow microspheres, and molding the mixture to form a molded body;

heating the molded body to expand it;

curing the expanded molded body; and

pyrolyzing the cured molded body.

5. The method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer according to claim 1 or 4, wherein the expansion of the molded body is carried out by heating at a temperature of 110~200°C, the temperature range between the softening point and the melting point of the preceramic polymer, to expand the expandable hollow microspheres.

6. The method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer according to claim 1 or 4, wherein the preceramic polymer is at least one polymer selected from the group consisting of polycarbosilane, polysiloxane, polysilazane and mixtures thereof.

7. The method for fabricating a highly porous ceramic

from expandable microspheres and a preceramic polymer according to claim 1 or 4, wherein the preceramic polymer powder is added in an amount of 20% by weight or more, based on the total weight of the starting materials.

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8. The method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer according to claim 1 or 4, wherein the expandable hollow microspheres are added in an amount of 20% by weight or more, based on the total weight of the starting materials.

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9. The method for fabricating a highly porous ceramic from expandable microspheres and a preceramic polymer according to any one of claims 1, 4 and 9, wherein upon heating the expandable hollow microspheres to 110~200 °C at atmospheric pressure, the shell is softened and the inner medium is expanded to form spherical hollow spheres having an average diameter of 10-200 μm.

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10. A highly porous ceramic fabricated from expandable microspheres and a preceramic polymer, in accordance with the method according to claim 1 or 4 wherein the highly porous ceramic has a high porosity of not less than 60% and a pore density of not less than  $10^8$  pores/cm<sup>3</sup>.

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